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Quantifying the behavior of Monosodium Urate Crystals in a Magnetic Field AMANDA MCGREER, CHASE WATERMAN, JESSICA THOMAS, DANIELLE KARA, John Carroll University — The clinical success of malaria detection with our Magneto-Optical Device ("MOD") motivates research into expanded applications of the device. Diagnosis of gout with use of the MOD is the ultimate goal of this research. Gout appears when high accumulations of uric acid and sodium from blood form monosodium urate (MSU) crystals. MSU crystals deposit in joints, tendons and bursa spaces causing in inflammation and severe pain. Current clinical methods for gout diagnosis are unable provide early or easy diagnosis. However, we have developed a new way of detecting gout by exploiting the magnetic and optical properties of MSU crystals in a magnetic field. MSU crystals rotate in an applied magnetic field due to their magnetic susceptibility anisotropy. The extinction properties of these MSU crystals depend on the orientation of the particle relative to the polarization of light, making the MSU crystals detectable by the MOD. In this work, we demonstrate the feasibility of MSU detection in MOD and quantify the extinction proprieties of MSU crystals. Understanding MSU extinction properties will lead to a new clinical method of gout diagnosis with MOD.

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